NESMU-JUL-001E(V.1.1)

JuLI™

Smart fluorescent cell analyzer

User Guide

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Bulldog Bio

Developed and Manufactured by NanoEnTek, Inc.

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JuLI™, User's Guide

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The information in this manual is described as accurately as possible. Firmware and software changes and updates may change without prior consent or notification.

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Product Contents

JuLI™ is shipped with the following components. Once you receive your instrument, please check that all items listed below were shipped.
If any items are missing or damaged, contact your local distributor or sales@digital-bio.com.

Items	Quantity
JuLI™, Smart fluorescent cell analyzer	1
Plate cover for GFP	1
Adaptor (+12V)	1
Power Cord (4 pcs/set, for U.S./Canada/Taiwan/Japan, Europe or UK)	1
JuLI™ SD card (Instruction Manual and PC software included)	1
Instruction Manual	1
Quick reference card	1

After receiving JuLI™, examine carefully for any damage incurred during transit. All damage claims must be filed with the carrier.

CAUTION:
Neglecting to remove any or all shipping brackets or foams prior to operation may result in damage to the equipment.
The shipping brackets or foam inserts must be reinstalled prior to shipping the unit to prevent damage to the equipment.

Safety Precautions

Review and follow the safety instructions below.

- If water or other material enters the instrument, adaptor, or power inlet, disconnect the power cord and contact a service person. For operating environment, refer to **Product Specifications (next page).**

- Do not touch the main plug or power cord with wet hands.

- Always ensure that the power supply input voltage matches the voltage available at your location.

- This instrument is air-cooled and its surfaces may become hot during operation. When installing leave a space of more than 10 cm (4 inches) around the instrument and do not place any objects between the instrument and the any walls.

- Do not install the instrument on a slant or a place prone to vibrations, which induces the risk of instrument malfunction or damage of the instrument.

- Never insert any objects into the air vents of the instrument as this could result in electrical shock, personal injury, and equipment damage.

- Plug the power cord firmly into the wall outlet and AC adapter.

- To avoid potential shock hazard, make sure that the power cord is properly grounded.

- Be sure to position the equipment such that it is easy to disconnect.

- Turn off the instrument before unplugging the power cord and/or moving the instrument.

- If the instrument is dropped or broken, disconnect the power cord and contact a service person. Disassembly of case will void warranty.

- Use only authorized accessories (adaptor, power cord, and SD card).

Symbols

Symbol	Meaning
	Caution & Warning
	Protective earth (Ground)
CE	This instrument and consumables conforms to the Declaration of Conformity.

Product Specifications

Environmental Conditions	
Operating Power	AC 100-240V
Frequency	50-60Hz
Electrical input	12 VDC, 1.0A
Installation site	Indoor use only
Operating Temperature	10–45°C
Maximum Relative Humidity	20-90%

Instrument Specifications	
CPU	AMD AU1250
Magnification	Objective 4X and digital zoom (10x and 20x compatible)
Filter	Excitation / Emission / Dichroic filter
Light source	White / Blue LED GFP: 488nm excitation, 520nm emission
	(Optional) White / Green LED RFP: 530nm excitation, 590nm emission
Camera	CMOS 1.3M pixels (1280X1024)
Display	7’ TFT-LCD (WVGA, 800X480)
Weight	< 5 kg
Size	240X350X320 mm
Data storage	SD card (8G)

Setup

1. After unpacking the instrument, place the instrument on a level, dry surface. Allow at least 10 cm (4 inches) of free space at the back of the JuLI™ to allow for proper ventilation and prevent overheating of electronic components.

2. Plug the supplied power cord into the JuLI™ instrument.
   Attach the appropriate plug adaptor, based on the electrical outlet configuration of your country.

3. Plug the power cord into the electrical outlet. Be sure to use only the power cord supplied with your instrument. Powering the instrument with an unapproved power cord may damage the instrument.

4. When ready to use, start the JuLI™ instrument by pressing the **Power button.**

IMPORTANT! ***NEVER grasp the neck of JuLI™ to transport.***
Always carry the JuLI™ with both hands. Place your hands and grasp the sides of the base avoiding LCD screen.

IMPORTANT! ***NEVER expose JuLI™ to UV light.***
UV light degrades many materials, including plastic. Damage from UV exposure is not covered under the manufacturer's warranty.

Setup,

Installing JuLI™ in a Cell Culture Hood or a Cell Culture Incubator

Fluorescent live-cell images from various cell culture dishes are directly captured in a cell culture hood. This compact design allows installation of device in hood or incubator prevents contamination by maintaining a sterile environment. Also the easily-viewed display allows quick and convenient to use in a cell culture incubator for capture time lapse imaging.

Dimensions & Features	Size
Width	24 cm
Depth	35 cm
Height	32 cm
Weight	< 5 kg
Power Cord	1

Cell Culture Hood

Cell Culture Incubator

⚠ ***IMPORTANT!***

Do Not directly spray ethanol anywhere on the JuLI™. Always wipe surfaces with ethanol-soaked paper towels instead.

Description, Front view

The **LCD Touch Screen** located at the front of the instrument contains buttons for necessary functions and displays bright field and fluorescence images.

The **Focus Knob** is used to adjust the image quality to obtain better bright and fluorescent cell images.

The **Capture button** is used to acquire bright field and fluorescent images.

Description, Rear view

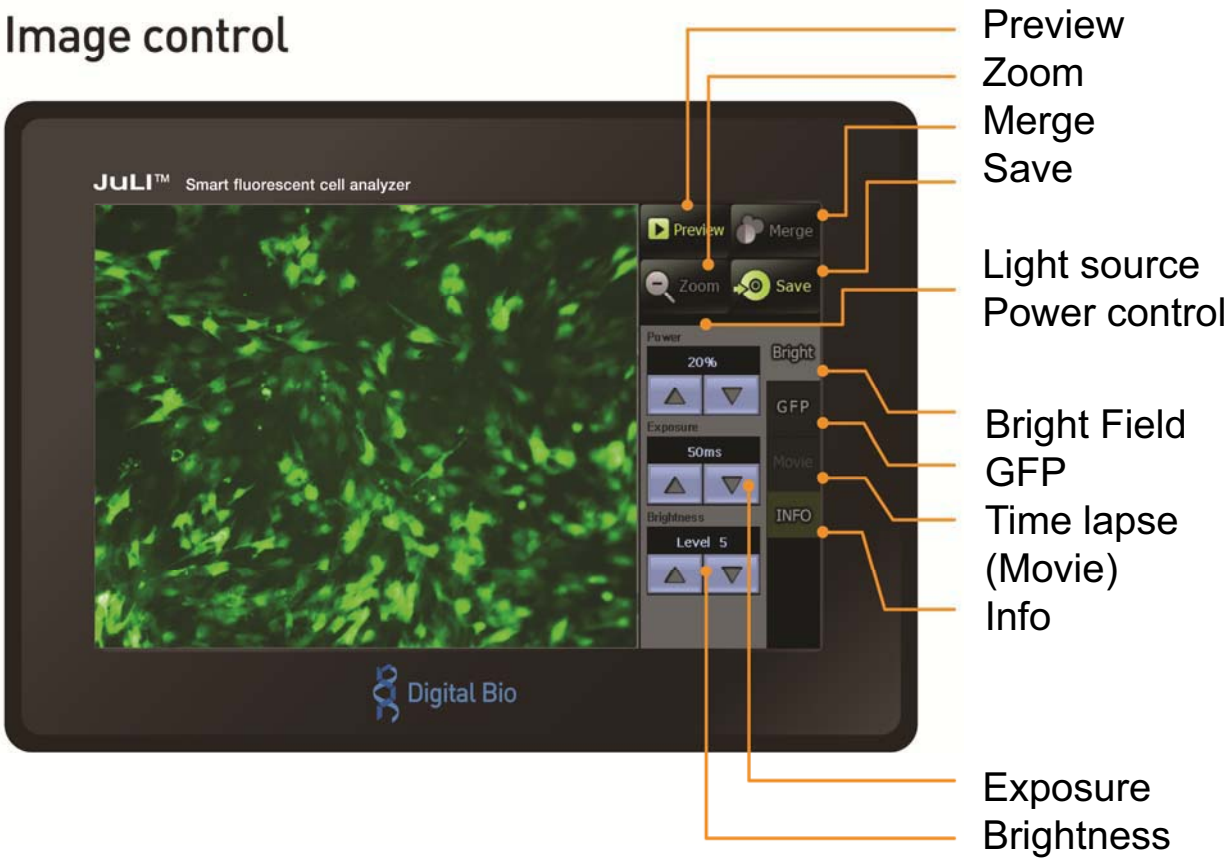
The **Power button** is used to turn the instrument on and off.

The **SD slot** allows you to transfer and save images to your PC for data storage and printing purposes. The SD card supplied with the instrument is inserted into the SD slot for data transfer. See page 21 for **Transferring Data to a PC.**

The **Power Inlet** connects the JuLI™ to an electrical outlet using the supplied power cord and the appropriate plug (based on the electrical outlet configuration in your country).

Rear view of JuLI™

Description, User Interface



The touch screen user interface of the JuLI™ ,Smart fluorescent-cell analyzer provides new tools to expand cellular research through proprietary software. Insightful data can be acquired, such as proliferation assays and live-cell counting.

Software Highlights

✓Live cell imaging
✓ Bright field / Fluorescent cell images
✓ Time-lapse imaging
✓ Merged bright field / fluorescence images

Product overview

Increasingly researchers are using live-cell imaging to study cellular functions. The JuLI™, a smart fluorescent cell analyzer, was developed to easily view and capture images from live-cell experiments.

The JuLI™ uses state-of-the-art optics and image analysis to obtain fluorescent live-cell images from cell culture dishes in a sterile hood. The compact design allows installation in a tissue culture hood or incubator limits contamination.

The JuLI™ is able to capture sequential time-lapse fluorescence and/or bright images and which can be converted to movie files. Growing live-cell movies can be generated even in cell-culture incubator.

The JuLI™ performs fluorescent / bright cell counting measurements using the user-friendly image processing software.

Product overview, continued

Important features of the JuLI™ smart fluorescent cell analyzer :

● All-in-one stand-alone systems
The compact easy-to-use design allows the JuLI™ to be placed in a tissue culture hood or incubator. Integrated display and on-board computer allows JuLI™ to operate PC-free.

● 40,000 hr lifetime White / Blue LED
LED light utilized for bright-field and fluorescence imaging has a life expectancy of approximately 40,000 hours. Consistent performance over multiple years of use is provided with the white and blue LEDs.

● Dark-room free
Unlike a conventional microscope, fluorescence imaging can now occur with the room lights on, and out in the main laboratory area.

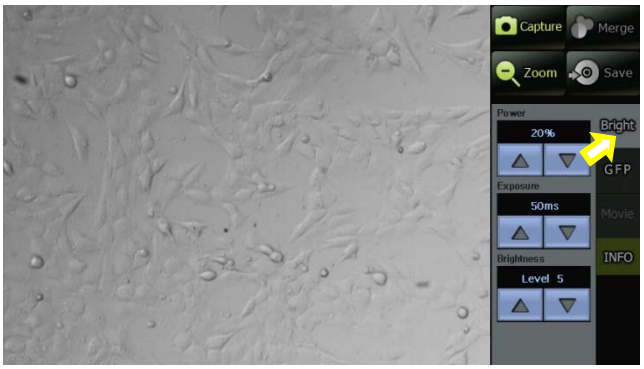
● Counting & analyzing with image processing software*
Proprietary software expands the applicability of the JuLI™ Smart fluorescent-cell analyzer. Fluorescence experiments such as proliferation assays, live-cell counting, or biomarker labeling.

● Communication through wireless data transfer *
Utilizing Wi-Fi technology, all data (including images and movies) can be transferred automatically from JuLI™ to PC.

* Upcoming technology

Operation, Bright-field imaging

1. Press the **Power button** to start the JuLI^{TM}. The main screen will be displayed.
2. Place sample on the stage.

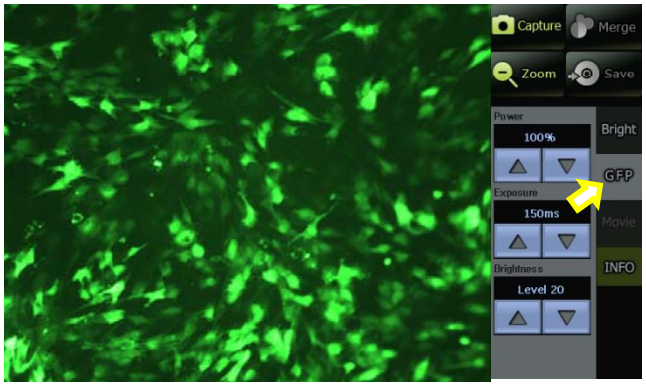


3. Turn on illumination using the **Bright button**, located on the right side of the LCD touch screen.
4. Adjust the illumination intensity, using the **Exposure** and **Brightness buttons**.
5. The **Zoom button** and the section window allow the user to magnify the desired region using software.

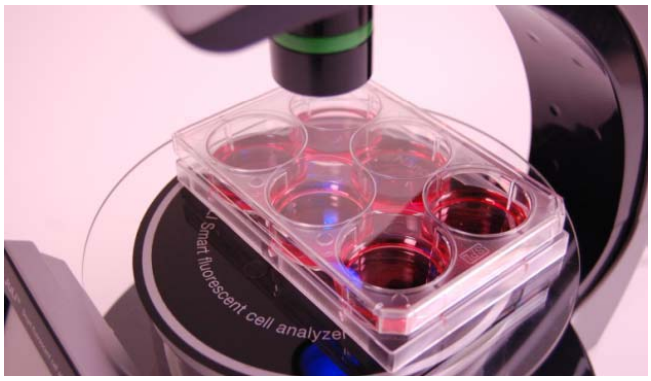
6. While viewing cells in the Zoom mode, use the **Focus knob** to further adjust the image.
7. Press the **Capture button** to acquire image.
8. Press the **Save button** to save the image. The Save screen will pop up.

Operation, Fluorescence imaging

1. Press the **Power button** to start the **JuLI™** and display the main screen.
2. Place the sample on the stage.



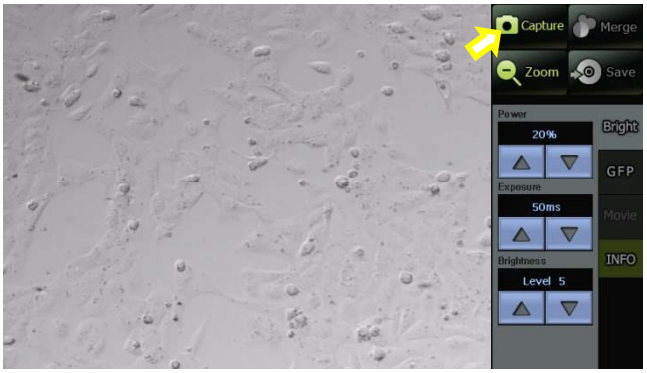
3. Turn on illumination using the **GFP button**, located on the right side of the LCD touch screen.



4. Adjust the illumination intensity, using the **Exposure** and **Brightness buttons**.
5. The **Zoom button** and the section window allow the user to magnify the desired region using software.
6. While viewing cells in the Zoom mode, use the **Focus knob** to further adjust the image.
7. Press the **Capture button** to acquire image.
8. Press the **Save button** to save the image. The Save screen will pop up.

Operation, Merged Image: Fluorescence and Bright-field

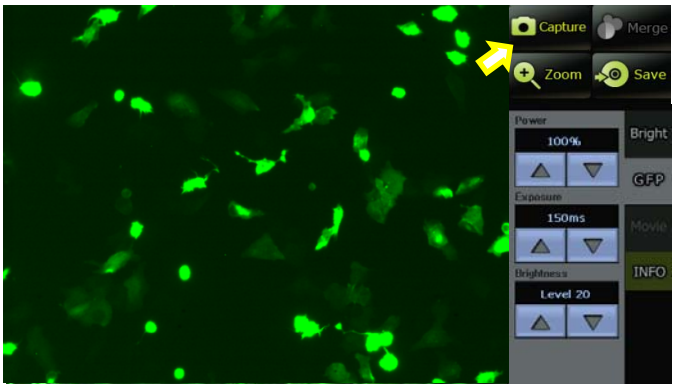
1. Press the **Power button** to start the **JuLI™** and display the main screen.
2. Place the sample on the stage.
3. Turn on illumination using the **Bright button**, located on the right side of the LCD touch screen.
4. Adjust the illumination intensity, using the **Exposure** and **Brightness buttons**.
5. The **Zoom button** and the section window allow the user to magnify the desired region using software.



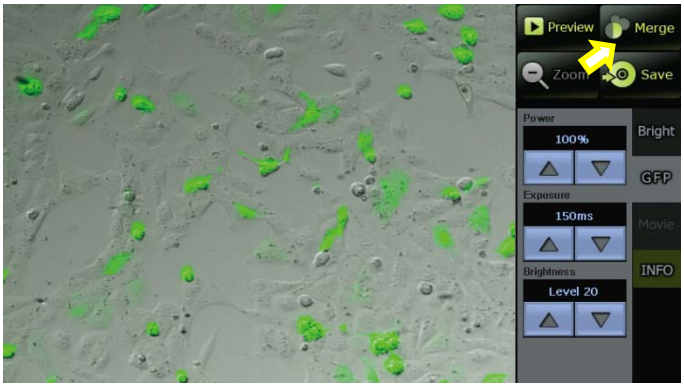
6. While viewing cells in the Zoom mode, use the **Focus knob** to further adjust the image.
7. Press the **Capture button** to acquire image.
8. Turn on illumination using the **GFP button**, located on the right side of the LCD touch screen.

Operation, Merged Image: Fluorescence and Bright-field, continued

9. Adjust the illumination intensity if necessary, using **Exposure** and **Brightness buttons**.
10. Adjust the image by using **Focus knob**.



12. Click the **Capture button** to acquire the image and then the **Merge button** will be activated.



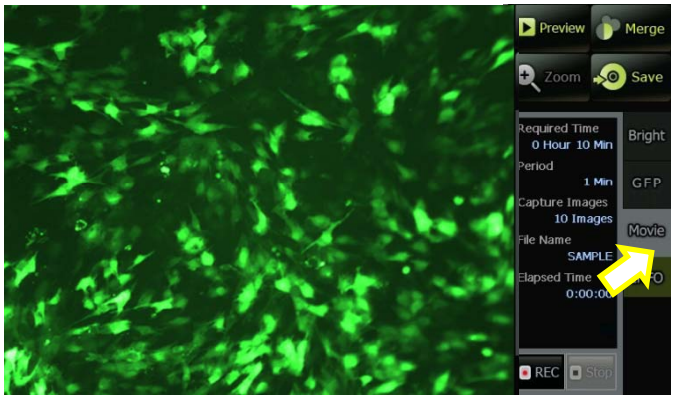
13. Press the **Merge button** to show the merged color image.
14. Press the **Save button** to save the image. The Save screen will pop up.

Operation, Time Lapse Imaging

With JuLI™, you can set up your cells and program the JuLI™ to record time lapse images. To use this feature, click the Movie button, program the settings (number of Images, period), save the file name and click the **Rec button**.

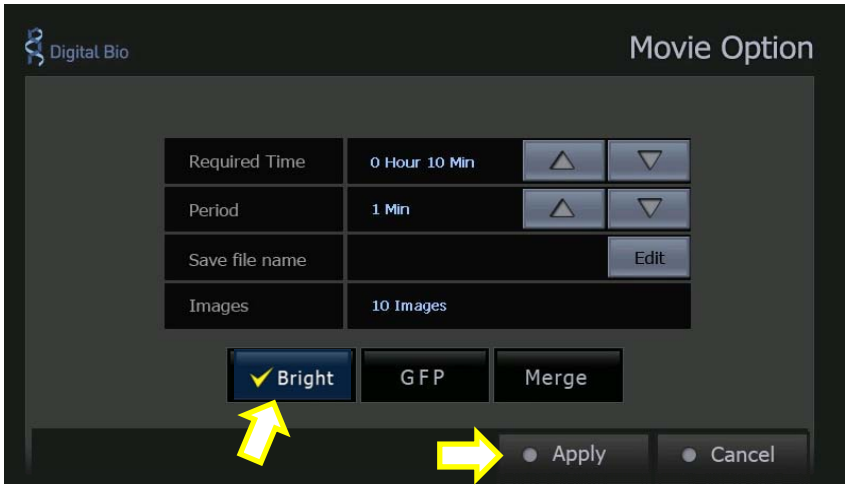
1. **Press the Power button to start the JuLI™ at room temperature for approximately 20 minutes before placing into the incubator.**

2. Place the sample on the stage.
3. Turn on illumination using the **GFP or Bright button**, located on the right side of the LCD touch screen.
4. Adjust the illumination intensity if necessary, using the **Exposure and Brightness button.**
6. Adjust the image by pressing the **Zoom button and choose the section**.
7. While viewing cells in the Zoom In mode, use the **Focus knob** to adjust the cell image.



8. Click the **Movie button** to make the time-lapse imaging.

Operation, Time Lapse Imaging, continued



8. Press the **Required Time button** and enter the total running time.
   It will be automatically displayed the total images.
9. Press the **Period button** to set the time interval.
10. Press the **Save file name** to save the movie name.
11. To create a movie file, choose the **Bright/GFP/Merge button**.
    Bright button: To record the bright movie only.
    GFP button: To record the GFP movie only.
    Merge button: To record the merged movie only.
    Bright + GFP: To record the bright and GFP movie
    Bright + GFP + Merge: To record the all channels
    * If you use the GFP cover, the only GFP images can be acquired.
12. Press the **Apply button** to confirm the movie options.

13. Press the **Rec button** to begin time lapse imaging.
    JuLI™ will display the live cell images during the time lapse imaging.

Operation, Transferring Data to a computer

1. To archive your data or generate a printed report, insert the **JuLI™** SD card into the SD port.

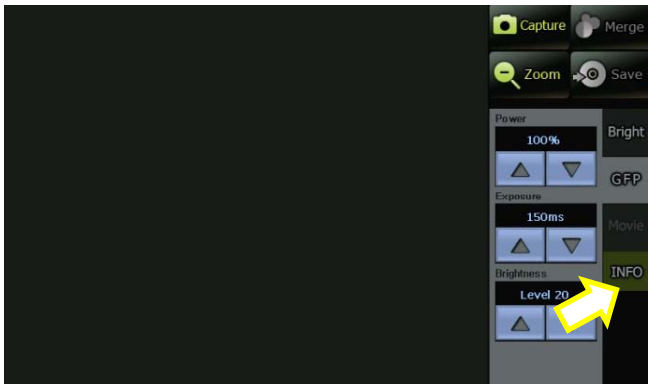
2. Save your data on the SD card by pressing the **Save button** on the main screen. The image is automatically saved as a .bmp file that can be opened with the JuLI™ imaging program.
3. Enter the file name using the keypad buttons displayed on the Save menu.

4. Transfer the **JuLI™** SD card to the SD port on your PC. You may open the .bmp file using the JuLI™ imaging program.

Operation, updating software

Periodically, Digital-Bio adds functionality and other improvements to the JuLI™ user interface. We recommend keeping your JuLI™ up to date with the latest software.
If you have any questions about software updates, contact sales@digital-bio.com

1. Visit the JuLI™ website at www.digital-bio.com to download updated firmware which is supplied as a .zip file to your desktop.
2. Unzip the .zip file and save the firmware to the SD card supplied with the instrument.
3. Insert the SD card into the SD port on JuLI™ .



4. Press the **Power button** to start the instrument and click the **INFO button**.

5. Click the **Update button**. The update process takes a few minutes.
6. When the update is complete, you are prompted to restart the instrument by pressing **Restart**.

Care & Maintenance

Clean the surface of the JuLI™ instrument with a damp cloth. To clean the LCD screen, turn off the JuLI™ instrument, disconnect the power cable, and clean the LCD screen with a soft cloth lightly moistened with LCD cleansing detergent. Cleaning the screen with excessive force can damage the LCD the screen. Wipe the screen dry immediately.

If liquid spills on the JuLI™, turn off the power immediately and wipe dry.

The JuLI™ does not need regular maintenance. To troubleshoot problems with JuLI™, contact Technical Support (page 27).

IMPORTANT! *Never disassemble or service the JuLI™ yourself. Unauthorized repairs may damage the JuLI™ or alter its functionality, which will void your warranty. Contact sales@digital-bio.com or your local JuLI™ distributor to arrange for service.*

IMPORTANT! *Do not soak any surface in ethanol. NEVER spray ethanol on the JuLI™. Wipe surfaces with ethanol-soaked paper towels instead.*

IMPORTANT! *Never expose JuLI™ to UV sterilization. UV degrades many materials, including plastic. Damage from UV exposure is not covered under the manufacturer's warranty.*

Troubleshooting

Poor merged image	Re-capture images in bright-field / fluorescence.
Poor bright-field image	Re-optimize the brightness and exposure value. Reset on the power button
Poor fluorescence image	Re-optimize the brightness and exposure value. Confirm fluorescence with a positive control sample.
LCD screen is black	Touch the LCD screen with your finger . Verify power supply is connected and power switch is on. Click the Bright or GFP button. Reset on the power button.
Saving problems	Do not save too many files on the SD card
Merge button does not respond when clicked	Click capture first; It is only possible to merge an image that is captured as bright field and fluorescence images.
Bright-field time-lapse images become dark and bright	Check for and remove any condensation on the lid of the culture dish.
JuLI™ does not power up	Check power switch on right side of unit. Check power source or contact your distributor.

Warranty

Digital Bio warrants that the JuLI™ will be free from defects in material and workmanship for a period of one (1) year from date of purchase.

If any defects occur in the JuLI™ during this warranty period, Digital-Bio will repair or replace the defective parts at its discretion without charge. The following defects, however, are specifically excluded:
1. Defects caused by improper operation.
2. Repair or modification done by anyone other than Digital Bio or an authorized agent.
3. Damage caused by substituting alternative parts.
4. Use of fittings or spare parts supplied by anyone other than Digital Bio.
5. Damage caused by accident or misuse.
6. Damage caused by disaster.
7. Corrosion caused by improper solvent or sample.

For your protection, JuLI™ units being returned must be insured against possible damage or loss. Digital Bio cannot be responsible for damage incurred during shipment of a defective instrument. It is recommend that you save the original packing material in which the instrument was shipped. This warranty is limited to the replacement of defective products.

For any inquiry or request for repair service, contact sales@digital-bio.com or your local distributor.

Appendix

The following products can be used with the JuLI™ ,
Smart fluorescent cell analyzer and are available separately from Digital-bio.

For more information, visit www.digital-bio.com.

Product	Quantity	Catalog no.
JuLI™, Smart fluorescent cell analyzer	1	JULI-B004
JuLI™ SD card (Instruction Manual and PC software included)	1	
JuLI™, Adapter with power cods	1 set	